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small pieces of grape juice gelatin, in which the mycelium of the fungus was growing. Inoculation experiments with spores were not successful. The authors suggest that plants in nature may become infected through aphid punctures, the honey dew furnishing a means for the germination of the spores, or by means of frost injuries, or by accidental wounds made in picking the fruit. Since infection by any of these means was not demonstrated, and the authors' own infection experiments with conidia were unsuccessful, these suggestions would be more convincing if supported by more experimentation and less theory.

The disease produced by *Cytosporina Ribis* resembles in its general effects that caused by *Botrytis*. The infection takes place through a wound, as is shown by the universal occurrence of an old scar or dead stump at the point from which the disease spreads. Cross-sections of infected branches show that the wood is brown and discolored except for a lighter sector-shaped area. The wood is permeated with hyphae which, unlike those of *Botrytis*, are able to dissolve the lignified elements of the stem. The progress of the mycelium is accompanied by the formation of wound-gum which accumulates in the cells and vessels. The gum, at least in the wood parenchyma and medullary rays, appears to be formed from the starch. It seems that the accumulation of gum occurs only within the cells and does not involve the destruction of whole areas of tissues, as in most cases of gummosis.

MCALPINE¹⁴ reports a number of laboratory experiments with *Phytophthora infestans*, among which is an attempt to determine the possibility of destroying the mycelium in infected potato tubers without destroying the life of the tubers. Slices taken from diseased tubers were subjected to a temperature of 49° for four hours, and the fungus was found to have been destroyed. Afterward seed potatoes were subjected to the same heat and were found to sprout freely, hence the conclusion that seed potatoes can be thoroughly disinfected in the way described. It seems that the method should at least have been given a more extended trial to justify the conclusion, for it is not unlikely that whole tubers would be injured if subjected to that temperature long enough to kill the mycelium in their interior, although the mycelium might be readily killed in thin slices. The author does not state whether the slices in which the mycelium was actually killed retained their vitality through the treatment or not. Neither does he state that the seed potatoes used were diseased before the treatment and free from disease afterward.—H. HASSELBRING.

The species of *Penicillium* and *Aspergillus*.—The forms of Fungi imperfecti grouped under the name *Penicillium*, on account of their omnivorous habits, have served as subjects for numerous physiological investigations, but as a rule little attention has been given to the determination of the species in

¹⁴ MCALPINE, D., Some points of practical importance in connection with the life history stages of *Phytophthora infestans* (Mont.) DeBary. Ann. Myc. 8:156-166. pl. 1. 1910.

this group. The genus has been as repellent to the systematist as it has been attractive to the physiologist. With the exception of the work of DIERCKX, only a brief abstract of which seems ever to have been published, there has been no effort to disentangle the mixture of forms of this genus. The efforts of THOM¹⁵ toward clearing up this tangle and making possible the identification of forms will be welcomed, therefore, by botanists and especially by plant physiologists, who are now enabled to connect certain physiological activities with definite species.

The plan of the work has been to carry out on different media of known composition series of cultures of all forms obtainable, and base the distinction of species upon differences in the forms and in their reaction upon the media under similar environment. The method is essentially that which has enabled bacteriologists to classify the enormous number of forms with which they deal. By this method it is shown that the same species differs greatly in morphological characteristics and physiological reactions when grown on different media. Species that resemble each other upon one medium show marked differences upon other media. The characters of the plants are constant for each medium upon which they are grown. The cultural work of this investigation has extended over more than four years, and has resulted in the accumulation of many valuable physiological data which are conveniently tabulated at the end of the paper.

In the systematic part of the work 36 species and 3 varieties are carefully described and their reactions upon various culture media given. Of these, 13 species and 3 varieties are described as new; 9 are described under numbers, since the author feels that their characteristics are not yet sufficiently well known to warrant giving them names. Camera lucida drawings showing the modes of branching of the conidiophores, and other diagnostic characters are given for 33 species and the 3 varieties. The number of species described probably represents a large proportion of the known species of *Penicillium*. Many of them are described as new, but it may be that of these some are included in the 80 odd species in the *Sylloge*, for it is practically impossible, as the author has found in spite of the most painstaking attempts, to identify plants with older descriptions or herbarium material.

A work similar in nature, but far less in extent, was done by MANGIN¹⁶ for a small group of molds of the genus *Aspergillus*. He takes up the forms confused under the name *Aspergillus glaucus*, securing 23 collections from various sources and subjecting them to comparative study under various conditions. Their reactions to different temperatures and to different nutrient solutions enabled him to separate the forms into few groups, the reactions of whose

¹⁵ THOM, CHARLES, Cultural studies of species of *Penicillium*. Bur. Animal Ind. Bull. 118. pp. 109. 1910.

¹⁶ MANGIN, L., Qu'est-ce que l'*Aspergillus glaucus*? Ann. Sci. Nat. Bot. IX. 10:303-371. figs. 15. 1909.

members were constant for the same media or temperatures. He shows that characters of the conidia are not sufficiently constant for the differentiation of species; the form and dimensions of the ascospores, however, are useful as diagnostic characters of species. Four species confused by authors as *Aspergillus glaucus* are described and figured; two of these are new. A variety *violaceum* is added under *Eurotium herbariorum*, and characters are given to separate these forms from two other members of the same group, *A. Oryzae* and *A. flavus*.—H. HASSELBRING.

Fossil Osmundaceae.¹⁷—In this final contribution on the fossil Osmundaceae, the authors bring to a conclusion their investigations and summarize their results for the whole series. The present memoir deals with a new stem, *Osmundites Kolbei*, from the Jurassic-Cretaceous (Wealden) of Herbertsdales, Cape Colony. The softer tissues are stated to be almost entirely destroyed before fossilization, so that only the fibrovascular and sclerenchymatous systems are left. The stem is much flattened and generally in a condition of extreme collapse. The authors state that the fibrovascular ring is so much flattened that the opposite sides are sometimes in contact with each other. They omit to state, a matter of the utmost importance in connection with their conclusions, clearly shown by their fig. 1, that the condition of maceration is so extreme that the central cylinder has not only collapsed but has been burst open and distributed throughout the cross-section of the stem. It is not surprising, in view of the extreme decay and displacement presented by their material, that they find tracheids and masses of tracheids scattered in the central substance lying in the midst of the displaced fibrovascular strands. The authors express the conviction "that there is no doubt that the tracheal elements are true and real constituents of the central tissue." It is unfortunate that they have not demonstrated the accuracy of their interpretation by figures of transverse sections on a sufficient scale of magnitude of the stelar tissues. An unprejudiced anatomist would scarcely admit the accuracy of their statements on the evidence they submit. From this highly disintegrated stem it is not surprising, in view of their previous statements, that they draw the conclusion that the central tissue of the osmundaceous stele was originally composed of tracheids, and that hence the pith in this family is a derivative of the fibrovascular tissues. The authors make the discovery, anticipated by Mr. SINNOTT in the case of the living Osmundaceae, that foliar gaps apparently absent in *Osmundites Kolbei* are in reality present. Finally, they draw up a table of the osmundaceous forms investigated by them, which shows clearly that the protostelic representatives are of more ancient origin, so far as the available geological record goes, than those with a developed pith. Their reasoning in regard to the medullate forms is not so conclusive, since they mention three species, *O. Gibbiana*, *O. Kolbei*, and *O. skidegatisensis*, from not very

¹⁷ KIDSTON, R., and GWYNNE-VAUGHAN, D. T., Fossil Osmundaceae. IV. Trans. Roy. Soc. Edinburgh 47: no. 17. 1910.